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# **MAGNETISM**

**9th Class Physics — Chapter 08**

75+ Multiple Choice Questions  
with Ticked Answers & Detailed Explanations

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## Section 1: Magnetic Materials and Properties

**1**

Which of the following materials is NOT attracted by a magnet?

a) Iron

b) Nickel

c) Copper

**d) Brass ✓ Correct Answer**

### Explanation:

*Magnetic materials are those that are strongly attracted to magnets. Iron, nickel, and cobalt are ferromagnetic. Brass is an alloy of copper and zinc, making it non-magnetic.*

2

A freely suspended bar magnet always comes to rest in which direction?

**a) North-South ✓ Correct Answer**

b) East-West

c) North-East

d) South-West

### Explanation:

*The Earth itself acts like a giant magnet. The magnetic north pole of the Earth attracts the south pole of the suspended magnet, and vice versa, causing it to align in the geographical North-South direction.*

3

**If a magnet is broken into two equal pieces, what happens to the poles?**

- a) We get an isolated North pole and an isolated South pole.
- b) Both pieces lose their magnetism.
- c) Each piece becomes a complete magnet with its own N and S poles. ✓ Correct Answer**
- d) One piece becomes completely non-magnetic.

### **Explanation:**

*Magnetic monopoles (isolated poles) do not exist in nature. If you break a magnet, the atomic alignment that creates the domains simply realigns, creating two smaller but complete magnets, each with its own North and South pole.*

**4**

**What is the true test to identify whether an object is a magnet or a simple magnetic material?**

a) Attraction

b) Heating

**c) Repulsion ✓ Correct Answer**

d) Suspending it

### **Explanation:**

*Both magnets and magnetic materials (like iron) are attracted to magnets. However, only a magnet will repel another magnet of the same pole. Therefore, repulsion is the definitive test for identifying a magnet.*

5

Which of the following is the strongest part of a bar magnet?

- a) The center of the magnet
- b) The poles (North and South ends) ✓ Correct Answer**
- c) The edges
- d) The magnetic field is uniform everywhere

### Explanation:

*The magnetic field lines are most densely packed at the poles. The strength of the magnetic field is directly proportional to the density of these field lines, making the poles the strongest points.*

6

Like magnetic poles \_\_\_\_\_ each other,  
and unlike poles \_\_\_\_\_ each other.

**a) repel, attract ✓ Correct Answer**

b) attract, repel

c) attract, attract

d) repel, repel

### Explanation:

*This is the fundamental law of magnetism. Similar poles (N-N or S-S) push away from each other (repel), while opposite poles (N-S) pull towards each other (attract).*

7

Which of the following is a natural magnet?

a) Alnico

b) Ferrite

c) Lodestone ✓ Correct Answer

d) Soft iron

### Explanation:

*Lodestone (magnetite) is a naturally occurring mineral that was discovered over 1000 years ago and possesses natural magnetic properties. The others are artificial magnets created by humans.*

8

**What happens when a magnetic compass is brought near a bar magnet?**

- a) The compass needle always points North.
- b) The compass needle spins randomly.
- c) The compass needle aligns itself with the magnetic field of the bar magnet. ✓ Correct Answer**
- d) The compass stops working.

### **Explanation:**

*A compass needle is a tiny magnet. When placed in an external magnetic field (like that of a bar magnet), it experiences a torque and rotates to align itself along the local magnetic field lines.*

## Section 2: Induced Magnetism, Temporary and Permanent Magnets

9

Which of the following is an example of a temporary magnet?

- a) Steel bar
- b) Alnico
- c) Soft iron ✓ Correct Answer
- d) Ferrite

### Explanation:

*Soft iron is easily magnetized but loses its magnetism quickly when the external magnetic field is removed. This makes it ideal for temporary magnets like electromagnets.*

10

Permanent magnets are usually made from:

- a) Soft iron
- b) Steel, cobalt, and alnico ✓ Correct Answer**
- c) Copper and brass
- d) Plastic and wood

### Explanation:

*Steel and special alloys like alnico retain their magnetic alignment (domains) permanently, making them suitable for permanent magnets.*

**11**

**When a piece of iron is brought near the North pole of a magnet, the near end of the iron becomes:**

- a) A North pole
- b) A South pole ✓ Correct Answer**
- c) A temporary North pole, then a South pole
- d) It remains neutral

### **Explanation:**

*This is induced magnetism. The North pole of the magnet attracts the opposite (South) poles of the atomic magnets in the iron, turning the near end into a South pole to facilitate attraction.*

**12**

**What happens to the magnetism of a temporary magnet when the external magnetic field is removed?**

**a) It vanishes ✓ Correct Answer**

b) It becomes permanent

c) It reverses its polarity

d) It becomes stronger

### **Explanation:**

*Temporary magnets (like soft iron) have domains that easily align with an external field but return to their random, non-magnetic state once the field is removed, causing the magnetism to vanish.*

**13**

**In the activity where iron and steel nails are hung from a magnet, why does the steel nail chain remain intact after removing the magnet?**

- a) Steel is not a magnetic material.
- b) Steel is a temporary magnet.
- c) Steel is a permanent magnet and retains its magnetism. ✓ Correct Answer**
- d) The steel nails were glued together.

### **Explanation:**

*Unlike soft iron (which loses magnetism instantly), steel retains its domain alignment once magnetized. Therefore, the steel nails remain magnetized and continue to attract each other, forming a chain.*

14

Induced magnetism is best described as:

- a) Breaking a magnet to create new poles.
- b) Heating a magnet to increase its strength.
- c) Magnetizing a material by bringing it near a permanent magnet. ✓ Correct Answer**
- d) The repulsion between two North poles.

### Explanation:

*Induced magnetism is the process where a magnetic material (like iron) becomes a magnet itself simply by being placed in the magnetic field of another magnet, without any physical contact or rubbing required.*

15

Which material is preferred for making the core of an electromagnet?

a) Steel

**b) Soft iron ✓ Correct Answer**

c) Copper

d) Aluminum

### Explanation:

*Soft iron is used because it has high permeability (it magnetizes strongly) and low retentivity (it loses its magnetism quickly when the current is switched off). This makes the electromagnet strong when active and easy to turn off.*

## Section 3: Magnetic Fields and Field Lines

16

**A magnetic field is defined as:**

- a) The path a compass needle takes.
- b) The space inside a magnet.
- c) The region around a magnet where a magnetic force can be detected. ✓ Correct Answer**
- d) The attraction between opposite poles.

### **Explanation:**

*A magnetic field is an invisible area of influence surrounding a magnet. Any magnetic material or another magnet entering this region will experience a force.*

17

The direction of magnetic field lines outside a magnet is:

**a) From North to South ✓ Correct Answer**

b) From South to North

c) From East to West

d) Random

### Explanation:

*By convention, magnetic field lines emerge from the North pole and enter the South pole outside the magnet. Inside the magnet, they travel from South to North.*

**18**

**The relative strength of a magnetic field is represented by:**

- a) The length of the magnet.
- b) The thickness of the magnet.
- c) The spacing of the magnetic field lines. ✓**
- d) The color of the magnet.

**Correct Answer**

### **Explanation:**

*Where magnetic field lines are drawn closer together, the field is stronger (e.g., near the poles). Where they are spread far apart, the field is weaker.*

19

A neutral point in a magnetic field is a point where:

- a) The magnetic field is infinitely strong.
- b) The compass needle points exactly North.
- c) The magnetic field due to one magnet cancels out the field due to another magnet. ✓**
- Correct Answer**
- d) There is no magnetic material.

### Explanation:

*At a neutral point, the combined magnetic field strength is zero. A compass placed here would not experience a net force from the nearby magnets.*

20

The magnetic field lines around a horseshoe magnet are:

- a) Completely circular
- b) Randomly scattered
- c) Uniform between the poles ✓ Correct Answer**
- d) Strongest in the middle of the gap

### Explanation:

*Unlike a bar magnet, the poles of a horseshoe magnet face each other closely. The field lines between them are parallel and equally spaced, indicating a uniform (even) magnetic field.*

**21**

**The direction of the magnetic field at any point is the direction:**

**a) Indicated by the North pole of a compass needle placed at that point. ✓ Correct Answer**

b) Indicated by the South pole of a compass needle.

c) Of the gravitational pull.

d) Opposite to the flow of electrons.

### **Explanation:**

*By international convention, the direction of the magnetic field vector at a specific location is defined as the direction in which the North pole of a freely suspended compass points when placed there.*

22

What happens to the magnetic field strength as you move away from the poles of a magnet?

- a) It increases.
- b) It decreases. ✓ Correct Answer**
- c) It remains constant.
- d) It fluctuates randomly.

### Explanation:

*Magnetic field lines spread out as they move away from the poles. Since field strength is proportional to the density of field lines, the field becomes weaker with increasing distance.*

## Section 4: Uses and Applications of Magnets & Electromagnets

**23**

**Which device uses a permanent magnet to convert electrical energy into mechanical energy?**

a) A.C. Generator

**b) Electric Motor ✓ Correct Answer**

c) Transformer

d) Battery

### **Explanation:**

*An electric motor uses the repulsion and attraction between a permanent magnet and an electromagnet (or another permanent magnet) to create rotational motion (mechanical energy) from electrical energy.*

24

**In a moving coil loudspeaker, what causes the cone to vibrate and produce sound?**

- a) A permanent magnet spinning rapidly.
- b) A varying force on the voice coil due to interaction with the permanent magnet's field.**
- ✓ **Correct Answer**
- c) The heating effect of the current.
- d) Static electricity.

### **Explanation:**

*Varying audio currents pass through the voice coil, creating a varying electromagnet. This interacts with the permanent magnet's field, creating a force that pushes and pulls the coil, vibrating the attached cone to produce sound waves.*

25

The strength of an electromagnet can be increased by:

- a) Decreasing the current.
- b) Decreasing the number of turns in the coil.
- c) Increasing the number of turns in the coil and increasing the current. ✓ Correct Answer**
- d) Using a plastic core instead of an iron core.

### Explanation:

*The magnetic field of an electromagnet is directly proportional to the current flowing through the coil and the number of turns in the coil. A soft iron core also dramatically increases its strength.*

26

**Which component of an electric bell acts as an electromagnet?**

- a) The gong
- b) The striker
- c) The coil of wire wrapped around an iron piece ✓ Correct Answer**
- d) The switch

### **Explanation:**

*When the switch is pressed, current flows through the coil wrapped around the iron piece, turning it into an electromagnet, which then attracts the iron armature (striker) to hit the gong.*

27

**What is the primary function of a magnetic relay?**

**a) To use a small current to switch on a circuit with a large current. ✓ Correct Answer**

b) To increase the voltage of a circuit.

c) To store electrical energy.

d) To convert AC to DC.

### **Explanation:**

*A relay is an electromagnetic switch. It allows a low-current, safe input circuit to control a high-current, dangerous output circuit without direct electrical connection.*

28

**Maglev trains operate based on the principle of:**

- a) Friction between wheels and tracks.
- b) Magnetic levitation and propulsion using electromagnets. ✓ Correct Answer**
- c) Jet propulsion.
- d) Gravitational pull.

### **Explanation:**

*Maglev (magnetic levitation) trains use powerful electromagnets to lift the train above the guideway (eliminating friction) and propel it forward using magnetic attraction and repulsion.*

29

**In a circuit breaker, what causes the circuit to break when excessive current flows?**

- a) The copper strip melts instantly.
- b) The electromagnet becomes strong enough to pull the iron armature, disconnecting the contacts. ✓ Correct Answer**
- c) A fuse wire burns out.
- d) The plastic frame expands.

### **Explanation:**

*During an overload, the current increases, strengthening the electromagnet inside the circuit breaker. This strong magnet pulls the iron armature, which trips the switch contacts and breaks the circuit to prevent damage.*

30

**Permanent magnets are used in door catchers because:**

- a) They generate electricity.
- b) They provide a strong, constant attractive force to keep the door closed. ✓ Correct Answer**
- c) They repel the door frame.
- d) They are cheaper than springs.

### **Explanation:**

*Door catchers use the permanent magnetic attraction between a magnet on the door and a metal plate on the frame to keep the door firmly closed without mechanical latches.*

**31**

**In a telephone receiver, the varying current in the electromagnet causes the diaphragm to:**

- a) Heat up
- b) Vibrate ✓ Correct Answer**
- c) Rotate
- d) Stay still

### **Explanation:**

*The varying electrical signals from the microphone change the strength of the electromagnet. This varying magnetic pull causes the iron diaphragm to move back and forth (vibrate), recreating the sound waves.*

## Section 5: Domain Theory and Types of Magnetic Materials

32

**According to the domain theory, a magnetic material is made up of:**

- a) A single large magnet.
- b) Free electrons moving randomly.
- c) Tiny regions called domains, each behaving like a small magnet. ✓ Correct Answer**
- d) Non-magnetic atoms.

### **Explanation:**

*Ferromagnetic materials consist of small regions (domains) where the magnetic fields of atoms are naturally aligned. In an unmagnetized state, these domains point in random directions, canceling each other out.*

33

Which of the following is a paramagnetic material?

**a) Aluminum ✓ Correct Answer**

b) Copper

c) Iron

d) Bismuth

### Explanation:

*Paramagnetic materials (like aluminum and lithium) have atoms with a small net magnetic dipole moment. They are weakly attracted to magnets but do not retain magnetism.*

34

**Diamagnetic materials are:**

- a) Strongly attracted to magnets.
- b) Weakly attracted to magnets.
- c) Weakly repelled by magnets. ✓ Correct Answer**
- d) Always permanent magnets.

**Explanation:**

*Diamagnetic materials (like copper, water, and bismuth) have atoms with zero net magnetic dipole moment. When placed in a magnetic field, they develop a weak magnetization that opposes the external field, causing weak repulsion.*

35

Which of the following is a ferromagnetic material?

- a) Copper
- b) Aluminum
- c) Cobalt ✓ Correct Answer**
- d) Water

### Explanation:

*Ferromagnetic materials (Iron, Nickel, Cobalt) have large groups of atoms with parallel spin alignments (domains). They are strongly attracted to magnets and can be permanently magnetized.*

36

**What happens to the domains in a piece of iron when it is placed in an external magnetic field?**

- a) They disappear completely.
- b) They rotate randomly.
- c) The domains parallel to the external field grow, and others rotate to align with the field.**  
**✓ Correct Answer**
- d) They break into smaller pieces.

### **Explanation:**

*The external field exerts a torque on the randomly oriented domains. Domains aligned with the field grow by consuming neighboring domains, and the remaining domains rotate to align, resulting in a net magnetic effect.*

37

**Why is soft iron preferred over steel for making transformer cores?**

a) Soft iron is cheaper than steel.

**b) Soft iron can be easily magnetized and demagnetized, minimizing energy loss. ✓**

**Correct Answer**

c) Soft iron is a permanent magnet.

d) Soft iron has lower permeability.

### **Explanation:**

*Transformers require rapid magnetization and demagnetization cycles. Soft iron's high permeability and low retentivity (ability to lose magnetism quickly) make it ideal for this purpose, preventing energy loss as heat.*

38

The size of a magnetic domain is typically in the order of:

- a) 1 meter
- b) 1 centimeter
- c) 0.1 millimeters ✓ Correct Answer**
- d) 1 nanometer

### Explanation:

*Magnetic domains are microscopic regions. They are typically about 0.1 mm in size, containing approximately  $10^{16}$  atoms.*

39

Which material has the highest magnetic permeability?

a) Air

b) Water

c) Soft Iron ✓ Correct Answer

d) Copper

### Explanation:

*Permeability is the ability of a material to allow magnetic field lines to pass through it. Soft iron has very high permeability, meaning it concentrates magnetic field lines much better than air or non-magnetic materials.*

40

Which of the following statements about a paramagnetic material is true?

- a) It has no unpaired electrons.
- b) It is strongly repelled by magnets.
- c) Its atoms have a small net magnetic field due to orbital and spin motion. ✓ Correct Answer**
- d) It retains magnetism permanently.

### Explanation:

*Paramagnetic materials have atoms with a permanent magnetic dipole moment, but these moments are randomly oriented. An external field aligns them weakly, causing weak attraction, but they lose alignment when the field is removed.*

## Section 6: Magnetization and Demagnetization

**41**

**The single-touch method of magnetization involves:**

**a) Stroking a steel bar with one pole of a permanent magnet in one direction. ✓ Correct Answer**

b) Stroking with both poles simultaneously.

c) Heating the steel bar.

d) Hammering the steel bar.

### **Explanation:**

*In single-touch magnetization, a magnet is dragged across a steel bar from one end to the other repeatedly, always in the same direction, using the same pole. This aligns the domains.*

42

**The double-touch method is more efficient because:**

- a) It uses two magnets of the same polarity.
- b) It uses two opposite poles stroking from the center outwards simultaneously. ✓ Correct Answer**
- c) It uses heat and pressure.
- d) It requires only one stroke.

### **Explanation:**

*By stroking from the center outwards with opposite poles, the domains are aligned outward from the center. This creates two strong poles at the ends more effectively than the single-touch method.*

43

**What happens to the polarity of the magnetized steel bar when using the single-touch method?**

- a) The stroked end becomes the same polarity as the stroking pole.
- b) The stroked end becomes opposite to the polarity of the stroking pole. ✓ Correct Answer**
- c) It becomes neutral.
- d) Both ends become North poles.

### **Explanation:**

*If you stroke a steel bar with the North pole of a magnet, the near end of the bar becomes a South pole (due to induced magnetism), and the far end becomes a North pole.*

44

**The Right-Hand Grip Rule is used to:**

- a) Demagnetize a solenoid.
- b) Determine the polarity of a magnetized solenoid. ✓ Correct Answer**
- c) Find the strength of a magnetic field.
- d) Identify diamagnetic materials.

### **Explanation:**

*The Right-Hand Grip Rule states that if you grip the solenoid with your right hand such that fingers curl in the direction of the conventional current, your thumb points towards the North pole of the solenoid.*

45

Which of the following is a method of demagnetization?

- a) Stroking with a magnet
- b) Placing in a solenoid with DC current
- c) Heating the magnet strongly ✓ Correct Answer**
- d) Cooling the magnet with ice

### Explanation:

*Heating a magnet causes strong thermal vibrations that disrupt the alignment of the magnetic domains. This randomizes them, effectively destroying the net magnetization.*

46

**How does hammering demagnetize a magnet?**

- a) It melts the magnet.
- b) The mechanical shock dislodges the domain alignment. ✓ Correct Answer**
- c) It introduces new magnetic poles.
- d) It increases the magnetic field.

### **Explanation:**

*Hammering physically shocks the material. This mechanical energy randomizes the magnetic domains, destroying their uniform alignment, similar to how heating disrupts them.*

47

When a magnet is moved slowly out of a solenoid connected to an AC source, it becomes:

**a) Demagnetized ✓ Correct Answer**

b) Stronger

c) Permanently magnetized

d) A diamagnet

### Explanation:

*Alternating current (AC) changes direction rapidly. As the magnet moves through the solenoid, it experiences rapidly reversing magnetic fields. This completely randomizes the domains, resulting in demagnetization.*

48

To magnetize a steel bar using a solenoid, what type of current should be passed through the solenoid?

- a) Alternating Current (AC)
- b) Direct Current (DC) ✓ Correct Answer**
- c) Pulsating current
- d) No current

### Explanation:

*Direct current (DC) provides a constant, steady magnetic field. This steady field aligns the domains of the steel bar placed inside the solenoid consistently in one direction, magnetizing it.*

## Section 7: Recording Technology and Magnetic Shielding

49

In magnetic tape recording, the plastic tape is coated with:

- a) Soft iron
- b) Copper
- c) Iron oxide ✓ Correct Answer**
- d) Aluminum

### Explanation:

*The recording surface of magnetic tapes is coated with a thin layer of ferromagnetic material, typically iron oxide, which can be magnetized to store audio, video, or digital data.*

50

What is a "fringe field" in magnetic tape recording?

a) The magnetic field inside the recording head.

**b) The part of the magnetic field that curves outward at the gap of the recording head. ✓  
Correct Answer**

c) The magnetic field of the Earth.

d) A broken magnetic tape.

### Explanation:

*The recording head has a narrow gap. The magnetic field lines that bridge this gap and curve outward (fringe field) penetrate the moving magnetic tape, inducing magnetization and recording the signal.*

**51**

**How does a hard disk drive store information?**

- a) By using a laser to burn pits.
- b) By magnetizing tiny spots on a spinning disk in different directions. ✓ Correct Answer**
- c) By physically punching holes in the disk.
- d) By using electrostatic charges.

### **Explanation:**

*Hard disks use a read/write head (a small electromagnet) to magnetize tiny regions of the disk's iron oxide coating. The direction of magnetization (North-South or South-North) represents binary 1s and 0s.*

52

**What is the advantage of hard disk drives over magnetic tape recorders?**

- a) Hard disks can store more data.
- b) Hard disks can locate and read/write data almost instantly. ✓ Correct Answer**
- c) Hard disks are cheaper.
- d) Hard disks do not use magnetism.

### **Explanation:**

*Hard disks allow random access (reading/writing anywhere instantly), whereas tape drives require sequential access (winding the tape to the correct location), making hard disks much faster.*

53

**Soft iron is used as a magnetic shield because:**

- a) It is a permanent magnet.
- b) It repels magnetic fields.
- c) It has high magnetic permeability and diverts magnetic field lines around the shielded object. ✓ Correct Answer**
- d) It is very heavy.

### **Explanation:**

*Soft iron provides an easy path for magnetic field lines. When a soft iron casing is placed around a sensitive instrument, the external field lines concentrate in the iron rather than passing through the instrument, shielding it.*

54

If a sensitive magnetic device is placed inside a soft iron casing, the magnetic flux inside the casing is:

- a) Very high
- b) Nearly zero ✓ Correct Answer**
- c) Equal to the external field
- d) Oscillating

### Explanation:

*The high permeability of soft iron means it effectively "absorbs" the magnetic field lines into its own walls, leaving the hollow interior essentially free of the external magnetic field.*

55

Which of the following is true about the magnetic shielding of a moving coil galvanometer?

- a) It increases the sensitivity of the galvanometer.
- b) It protects the galvanometer from external magnetic fields. ✓ Correct Answer**
- c) It uses a permanent magnet to shield the device.
- d) It uses copper casing.

### Explanation:

*A moving coil galvanometer is highly sensitive to stray magnetic fields. Encasing it in a soft iron shell shields it from external magnetic interference, ensuring accurate readings.*

## Section 8: Comprehensive and Conceptual Questions

56

Which of the following is NOT a ferromagnetic material?

- a) Iron
- b) Cobalt
- c) Copper ✓ Correct Answer
- d) Nickel

### Explanation:

*Copper is a diamagnetic material. It weakly repels magnetic fields. Iron, cobalt, and nickel are the three primary ferromagnetic elements.*

57

The concept of "magnetic dipole" is associated with:

- a) A single isolated magnetic pole.
- b) An atom behaving like a tiny magnet. ✓**
- c) A non-magnetic material.
- d) A broken magnet.

### Explanation:

*An atom with a net magnetic field due to electron spin and orbital motion acts like a tiny magnet with a North and South pole, hence it is called a magnetic dipole.*

58

In a bar magnet, the magnetic field is strongest at:

- a) The center
- b) The poles ✓ Correct Answer**
- c) The edges
- d) It is the same everywhere

### Explanation:

*The field lines are packed most densely at the poles, indicating the highest magnetic field strength. They spread out as they move towards the center.*

59

Which of the following devices does NOT primarily use an electromagnet?

- a) Electric bell
- b) Magnetic relay
- c) Compass ✓ Correct Answer**
- d) Circuit breaker

### Explanation:

*A compass uses a small permanent magnet (the needle) that aligns with the Earth's magnetic field. Electric bells, relays, and circuit breakers all rely on coils that become electromagnets when current flows.*

60

**Why does a magnet attract an unmagnetized iron nail?**

- a) Because the nail is already a magnet.
- b) Because the magnet induces magnetism in the nail, creating an opposite pole near it. ✓**
- Correct Answer**
- c) Because of gravitational force.
- d) Because the nail is made of copper.

### **Explanation:**

*The magnet's field realigns the domains in the iron nail. The end of the nail closest to the magnet develops an opposite pole, resulting in a strong attractive force.*

61

The S.I. unit of magnetic field strength (magnetic flux density) is:

- a) Newton
- b) Joule
- c) Tesla ✓ Correct Answer**
- d) Ampere

### Explanation:

*The Tesla (T) is the SI unit used to measure the strength of a magnetic field (magnetic flux density). One Tesla is equal to one Newton per Ampere-meter.*

62

Which of the following statements about magnetic field lines is FALSE?

- a) They form closed loops.
- b) They never intersect each other.
- c) They start from the South pole and end at the North pole outside the magnet. ✓ Correct Answer**
- d) They are closer together where the field is strong.

### Explanation:

*Outside the magnet, field lines go from North to South. Inside the magnet, they go from South to North. They never cross because a point in space cannot have two directions of magnetic force simultaneously.*

63

The process of aligning domains in a ferromagnetic material to create a net magnetic field is called:

- a) Demagnetization
- b) Magnetization ✓ Correct Answer**
- c) Induction
- d) Conduction

### Explanation:

*Magnetization is the process of aligning the randomly oriented magnetic domains within a material so that they point in a common direction, creating a net magnetic effect.*

64

Which of the following materials is used to make permanent magnets because it retains magnetism for a long time?

a) Soft iron

**b) Steel ✓ Correct Answer**

c) Copper

d) Brass

### Explanation:

*Steel has high retentivity (it resists demagnetization). Once its domains are aligned, they tend to stay aligned, making it ideal for permanent magnets.*

65

**A magnetic field line is defined as:**

- a) The path of a free electron.
- b) A curve whose tangent at any point gives the direction of the magnetic field at that point.**  
✓ **Correct Answer**
- c) A line connecting the North and South poles.
- d) An invisible string between poles.

### **Explanation:**

*Field lines are a visual tool. The tangent to a field line at any specific point indicates the exact direction a compass needle's North pole would point if placed there.*

66

The magnetic field of the Earth is thought to be generated by:

- a) The solid iron core.
- b) The motion of molten iron in the Earth's outer core. ✓ Correct Answer**
- c) The Moon's gravitational pull.
- d) Sunlight.

### Explanation:

*The motion of conductive molten iron in the Earth's outer core generates electric currents, which in turn produce the Earth's magnetic field (the geodynamo).*

67

When an iron rod is placed inside a solenoid carrying current, it becomes an electromagnet. If the current is switched off, the iron rod:

- a) Remains a strong permanent magnet.
- b) Loses almost all of its magnetism. ✓ Correct Answer**
- c) Reverses its poles.
- d) Explodes.

### Explanation:

*Soft iron is a temporary magnet. When the current stops, the external aligning magnetic field disappears. The domains in the soft iron immediately randomize, and the magnetism is lost.*

68

Which of the following is an example of a diamagnetic material?

a) Aluminum

b) Lithium

c) Bismuth ✓ Correct Answer

d) Nickel

### Explanation:

*Bismuth, copper, and water are classic examples of diamagnetic materials. They are weakly repelled by strong magnetic fields because their atoms have no permanent net magnetic moment.*

69

**In the domain theory, how do domains behave in a completely unmagnetized piece of iron?**

- a) All domains point North.
- b) All domains point South.
- c) Domains are randomly oriented, canceling out each other's magnetic effects. ✓ Correct Answer**
- d) There are no domains.

### **Explanation:**

*In an unmagnetized state, the magnetic moments of the various domains point in random directions. Their magnetic fields cancel each other out, resulting in zero net magnetization.*

70

**What happens to the magnetic field lines when two like poles are brought close together?**

- a) They merge together.
- b) They repel each other and curve away. ✓  
Correct Answer**
- c) They cancel each other out completely.
- d) They form a straight line.

### **Explanation:**

*Like poles repel. The field lines emerge from both North poles and push against each other, bending outwards and away from the space between the poles, creating a neutral point in the middle.*

71

Which of the following is the best method to make a strong permanent magnet from a steel bar?

- a) Single-touch method
- b) Double-touch method
- c) Placing it inside a strong solenoid with DC current ✓ Correct Answer**
- d) Hammering it repeatedly

### Explanation:

*While stroking works, placing a steel bar inside a solenoid with a strong DC current provides a very strong, uniform magnetic field that aligns the domains more effectively, resulting in a stronger and more permanent magnet.*

72

**Why does a magnetic compass needle point North?**

a) Because there is a magnet in the North Pole.

**b) Because the Earth behaves like a giant magnet, attracting the opposite pole of the compass needle. ✓ Correct Answer**

c) Because of wind currents.

d) Because of the Earth's rotation.

### **Explanation:**

*The Earth's magnetic South pole is near the geographic North pole. The North pole of the compass needle is attracted to this magnetic South pole, causing it to point towards geographic North.*

**73**

The magnetic recording head in a tape recorder is made of:

- a) A permanent magnet
- b) An electromagnet with a gap ✓ Correct Answer**
- c) A copper coil with no core
- d) A plastic magnet

### Explanation:

*The recording head is an electromagnet. Audio signals create a varying current in the coil, producing a varying magnetic field across the gap, which magnetizes the iron oxide tape passing over it.*

74

A soft iron ring is placed around a sensitive galvanometer. This is done to:

- a) Increase its weight.
- b) Make it look better.
- c) Shield it from stray magnetic fields. ✓**
- d) Increase the current passing through it.

**Correct Answer**

### Explanation:

*Soft iron has high permeability. The ring acts as a magnetic shield, diverting external magnetic field lines through the iron rather than letting them reach the sensitive internal components of the galvanometer.*

75

Which of the following best describes the relationship between magnetic field lines and field strength?

- a) The farther apart the lines, the stronger the field.
- b) The closer together the lines, the stronger the field. ✓ Correct Answer**
- c) The thickness of the lines determines the strength.
- d) Field lines do not indicate strength.

### Explanation:

*Magnetic field strength is proportional to the density (closeness) of the magnetic field lines. Concentrated lines (like at the poles) indicate a strong field, while spread-out lines indicate a weak field.*

# Well Done!

You have completed all 75 MCQs on Magnetism — 9th Class Physics, Chapter 08.

Keep practicing. Keep revising. Keep shining.

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